Ministry of Water, Land and Air Protection

Assessment of the Benefits Associated with the Financial Incentives for Recycling Scrap Tires Program

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Executive Summary

In response to concerns that scrap tires were posing environmental and human health risks, and to reduce the volume of scrap tires that were being landfilled and stockpiled, the Financial Incentives for Recycling Scrap Tires ("FIRST") program was implemented in 1991. Since its inception, the FIRST program has focused on alleviating these concerns by providing financial incentives for the transportation and recycling of scrap tires, with funding being provided through a government levy. However, beyond tracking diversion rates for scrap tires that would otherwise enter the waste stream, the benefits associated with the FIRST program have never been fully assessed.

A. Background

The Ministry of Water, Land and Air Protection ("Ministry"), formerly the Ministry of Environment, Lands and Parks, contracted Grant Thornton LLP to undertake an analysis of the impacts (benefits) resulting from the FIRST program. Specifically, the scope of this study entailed the identification and, where possible, quantification of a range of benefits attributable to the program using a multiple account analysis framework. In carrying out this work, it was also anticipated that any knowledge gained on the advantages and areas for improvement in relation to the methodology used to assess these benefits could inform future studies of this nature.

Both the Ministry and Grant Thornton LLP would like to thank the many individuals who were willing to participate in the survey and interviews. Without their invaluable contribution, this study would not have been possible.

B. Overview of the Program

The FIRST program provides a system of financial incentives to support the transportation, processing and utilization of scrap tires (excluding off-the-road tires) and is funded through the Ministry's Sustainable Environment Fund with revenues being generated as a result of a $3 levy on the purchase of new tires. The Pollution Prevention and Remediation Branch of the Ministry is primarily responsible for administration with contracted support services being provided by PricewaterhouseCoopers. The financial incentives, in turn, consist of:

- a transportation credit that is intended to help offset the costs of transporting BC-generated tires from across the province to registered processor and end-use facilities; and
- an end-use credit for the utilization of scrap tires with a distinction being made between applications for tire-derived fuel and tire-derived products.

Drawing upon fiscal 2000/01 figures, annual expenditures in the program total roughly $6.3 million, with incentives accounting for approximately $6.1 million. The remainder, slightly less than $250,000, supports the administration of the program.

C. Summary of Estimated Benefits

Based upon the information collected through a series of telephone and in-person interviews, a facsimile survey of program participants and the documentation review, a range of environmental, social and economic (business) benefits can be attributed to the FIRST program. With the exception of expanded capacities and operational lives of landfills and disposal facilities, which is reported as a cumulative benefit, those impacts that could be quantified are presented as annual values and draw upon fiscal 2000/01 figures.

Environmental and Social	Economic (Business)
❑ Cumulative benefits over the life of the program associated with an expanded life and capacity of landfills and disposal facilities ranging from roughly $7.2 million to $14.4 million, with an average value of $10.8 million. ❑ A reduced likelihood of uncontrolled fires, and attendant pollution and health impacts, that can be associated with stockpiling. ❑ Removal of breeding habitat for mosquitoes and other pests such as rats. ❑ Avoidance of any potential leachate from scrap tires and associated environmental impacts under certain short-term conditions.	❑ Enhanced market values for tire derived products and fuel. ❑ Reported increases in the volumes of scrap tires handled and level of industrial activity. ❑ A total of 195 jobs (direct, indirect and induced) in the transportation, processing and end-use sub-sectors. ❑ Almost $9 million in annual industry Gross Domestic Product, or GDP (direct, indirect and induced).[1] ❑ Approximately $1.8 million in annual Provincial and Federal revenues, excluding corporate taxes.

There are also positive economic benefits generated through the ongoing administration of the FIRST program, which supports a total of slightly more than three (3) full-time equivalent jobs (i.e., direct and indirect). Other attendant benefits include an estimated $264,000 in annual Gross Domestic Product (i.e., direct, indirect and induced) and approximately $35,500 in annual Provincial and Federal revenues (i.e., excluding corporate taxes).

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1 *Gross Domestic Product, or GDP, reflects the value added by BC businesses and workers. The value of goods and services from outside the province is accounted for (i.e., subtracted).*

D. Methodological Considerations

This assessment was carried out using a combination of telephone and in-person interviews, document reviews and a facsimile survey of program participants. In acquiring the necessary information to support the analysis though, a number of challenges were encountered, particularly in terms of obtaining business profile data from industry representatives. Furthermore, the figures were not adjusted to account for the economic impacts that might result in the absence of the FIRST program, although estimates presented in the main report indicate a much greater level of employment and Gross Domestic Product as a result of the program. The information and analysis provided in this document, therefore, is high-level in nature with the estimates being the best available.

I. Introduction

In response to concerns that scrap tires were posing environmental and human health risks, and to reduce the volume of scrap tires that were being landfilled and stockpiled, the Financial Incentives for Recycling Scrap Tires ("FIRST") program was implemented in 1991. Since its inception, the FIRST program has focused on alleviating these concerns by providing financial incentives for the transportation and recycling of scrap tires, with funding being provided through a government levy. However, beyond tracking diversion rates for scrap tires that would otherwise enter the waste stream, the benefits associated with the FIRST program have never been fully assessed.

A. Scope and Purpose of Study

The Ministry of Water, Land and Air Protection ("Ministry"), formerly the Ministry of Environment, Lands and Parks, contracted Grant Thornton LLP to undertake an analysis of the impacts (benefits) resulting from the FIRST program. Specifically, the scope of this study entailed the identification and, where possible, quantification of a range of benefits attributable to the program using a multiple account analysis framework. In carrying out this work, it was also anticipated that any knowledge gained on the advantages and areas for improvement in relation to the methodology used to assess these benefits could inform future studies of this nature.

Both the Ministry and Grant Thornton LLP would like to thank the many individuals who were willing to participate in the survey and interviews. Without their invaluable contribution, this study would not have been possible.

B. Overview of the Program

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- a transportation credit that is intended to help offset the costs of transporting BC-generated tires from across the province to registered processor and end-use facilities; and
- an end-use credit for the utilization of scrap tires with a distinction being made between applications for tire-derived fuel ("TDF") and tire-derived products ("TDP").

It is important to note that in order to receive credits, processors and end-users must be registered with the FIRST program and that transporters must have an agreement with a processor who will then provide payment for services received (i.e., transporters do not receive incentives directly under the program). Definitions for the various categories of program participants are provided in Table I-1 below.

Table I-1: General description of program participants

Generator	Generates scrap tires as a result of: ❑ selling new, reusable or retreaded replacement tires to consumers for their use; ❑ industrial activity which results in the wear or damage of a tire to a state in which it is no longer suitable for its original intended purpose for use on the wheel of a vehicle; or ❑ engaging in the dismantling of wrecked vehicles of which scrap tires are a by-product.
Transporter	A retailer, tire collector, independent trucking company or processor (end user) that has an agreement with a registered program processor to accept scrap tires.
Processor	Engaged in an activity that converts all, or a substantial portion (i.e., a minimum of 75% of the tire), of the scrap tire into a tire derived product ("TDP") or tire derived fuel ("TDF") for which there is an end market.
End User	Involved in the manufacturing of a new product, other than a tire, for sale at the wholesale or retail level. In so doing, the operation: ❑ consumes tire derived fuel ("TDF") for energy recovery; ❑ uses tire derived product ("TDP") as a raw material; or ❑ uses the whole tire in essentially its original form.

Drawing upon available program statistics, over 130 transporters have been identified as hauling scrap tires, to varying degrees, during the fiscal year 2000/01. At the same time, it is reported that there are four primary and a number of smaller registered processors and end-users.

The tire levy generated $10 million in revenues in fiscal 2000/01, with FIRST program expenditures for administration and the provision of incentives accounting for roughly $6.3 million over the same period. The transportation credit ranges in amount depending on the weight of the scrap tire load (i.e., in tonnes) and the distance hauled. The end-use credit varies depending on the application, and can range from no incentive to $1.50 per passenger-tire equivalent ("PTE") for TDP, and $0.70 to $0.90 per PTE for TDF.[2] This translates into a maximum end-use credit available under the FIRST program of $110 per tonne for TDF and $183 per tonne for TDP. A summary of the current state of program activity in terms of total expenditures on incentives and volumes of tires captured and handled under the program is provided in Table I-2 below.

[2] *A passenger-tire equivalent, or PTE, is a standardized unit for program tracking and reporting purposes, and consists of 8.2 kg.*

Table I-2: Summary of program activity in fiscal 2000/01

	Transportation	Processing-End Use	Total
1. Program incentive payments	$1,730,457	$4,353,418	$6,083,875
2. Annual tire volumes (PTEs)	2,936,368 TDP 487,298 TDF 3,423,666 Total	2,693,027 TDP 605,361 TDF 3,298,388 Total	

To-date, it is estimated that over 27 million PTEs have been diverted from landfills and other forms of disposal such as improper dumping and stockpiling over the life of the FIRST program.

C. Our Approach

The approach used in this study can be broken down into four primary stages, which are outlined below.

C.1 Orientation

Initially, it was necessary to establish a solid, factual understanding of the history underlying, and state of performance for, the FIRST program. This level of understanding was obtained through a preliminary review of documentation (e.g., program performance reports and statistics, news releases, etc.) and a select number of interviews.

C.2 Data Collection

The data collection comprised a facsimile survey and subsequent telephone interviews with program participants that were selected in a non-random manner. The survey instrument was limited to two-pages in length and was structured to allow for ease of response. To provide survey recipients with additional assurances and information on the purpose of the study, a cover letter was prepared on Ministry letterhead and signed by the Manager responsible for the program. In support of the telephone interviews, which were conducted following distribution and completion of the survey, a structured guide was prepared with a series of questions on the history of the program, the business profile, potential environmental impacts and other identifiable benefits. Both the survey and telephone interview guide were tested and reviewed by Ministry representatives, and revised accordingly.

Overall, it is estimated that those transporters completing the survey and telephone interview process account for almost 45% of the volumes that were hauled under the FIRST program in fiscal 2000/01. The processors and end-users responding to the survey and telephone interview are responsible for over 90% of the scrap tire volumes that were recycled in some fashion over the same time period.

These findings were then combined with a document review and in-person interviews with government and program representatives, as well as telephone interviews with a small sample of Regional District representatives across the province.[3]

C.3 Analysis and Conduct of Impact Assessments

The analysis for this assignment consisted of estimating the economic, environmental and social benefits associated with the FIRST program. Economic impacts (including direct, indirect and induced) were estimated through the BC Input-Output model which utilized the profile and expenditure information obtained from the program participant survey and telephone interviews. Specifically, direct expenditure data was coded to correspond to transaction categories that matched the Input-Output framework administered by BC Stats. The model was then used to transform the direct transactions into a Gross Domestic Product basis, and to calculate indirect and induced impacts. The Input-Output model also contained additional features that allowed for the estimation of both employment impacts and total tax revenue.

In the case of the environmental and social benefits, quantitative estimates were obtained where possible and in those cases where impacts could not be quantified, more qualitative considerations were noted.

C.4 Consolidation of Findings and Reporting

Once the analyses were performed, the findings were consolidated and used to prepare this report. It should be noted though, that the figures were not adjusted to account for the economic impacts that might result in the absence of the FIRST program.[4] Overall, the information and analysis provided is high-level in nature, with the estimates being the best available.

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[3] *Specifically, four Regional Districts that have established bans on the disposal of scrap tires in landfills, and two Regional Districts that have not.*

[4] *This notwithstanding, estimates presented on page 12 of the report indicate a much greater level of employment and Gross Domestic Product as a result of the program.*

II. Potential Benefits of the Program

This chapter summarizes the assessment of the potential impacts (benefits) associated with the FIRST program and, to the extent allowed by available information, their significance.

A. Environmental and Social

A range of environmental and social impacts or benefits can be attributed, to varying degrees, to the FIRST program. One such benefit that results from the diversion of scrap tires from disposal to other uses is the extension in capacity and life of landfill facilities. This is particularly valid in the case of scrap tires given that they do not compress in the same manner as other forms of waste. Drawing upon a number of studies and a limited number of interviews with Regional District representatives, a range can be established for the value associated with the cost of providing landfill space and ancillary services.[5] More specifically, the values used in this study ranged from a low of $40 per tonne to a high of $80 per tonne, with an average value of $60 per tonne being applied.

The volume of scrap tires handled over the life of the FIRST program was also estimated for the purposes of this calculation. This cumulative volume figure was adjusted downwards by a factor of 20% to account for the expected rate of diversion in the absence of the program (i.e., between ten and fifteen percent) and as a result of the imposition of levies and bans on scrap tires by select landfill operators.[6] Although based on anecdotal evidence, this adjustment factor appears reasonable given reported experiences of dumping, stockpiling and high rates of improper disposal of scrap tires taking place prior to the FIRST program being in existence. Furthermore, Regional District respondents indicated that although bans and levies have resulted in the diversion of scrap tires, these tires are then handled by an industry that is supported by the FIRST program.

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5 *Telephone interviews were carried out, for example, with representatives from the Greater Vancouver Regional District, City of Vancouver, and Peace River Regional District along with an additional four Regional Districts to ascertain the amount and composition of tipping fees and estimated costs associated with the handling and disposal of waste. This was supplemented by information contained in the "BC Municipal Solid Waste Tracking Report", 1999, which provided an average value of $60 in relation to the landfilling of mixed waste based on a survey of twenty Regional Districts.*

6 *Based upon an informal survey conducted by PricewaterhouseCoopers, approximately seven Regional Districts have established formal bans on scrap tire disposal in landfills, with a number of others either imposing levies or considering the option of a ban.*

"<scrap tires> are banned from disposal…these tires are diverted from landfill to the FIRST program" – *Regional District respondent*

"without the FIRST program revenues, they would have to be landfilled because of the prohibitive costs of shipping them." – *Regional District respondent*

Overall, the estimated cumulative benefits over the life of the program associated with an expanded life and capacity of landfills and disposal facilities ranges from approximately $7.2 million to $14.4 million, with an average value of $10.8 million.

Those program participants that were interviewed reported that there are environmental and aesthetic benefits (e.g., reduced risk of fire, lower rat and mosquito populations) associated with smaller and fewer stockpiles. This is supported by the findings from the interviews with select Regional District respondents, who generally noted that:

- Uncontrolled stockpiling can be a problem if not managed properly, with a resulting risk of fire and attendant pollution along with aesthetic impacts;
- Scrap tires tend to "float", or migrate, up to the surface in landfills and do not compact well in comparison to typical municipal solid waste;
- Leachate may be a problem at certain landfills and depending on the state of the scrap tire; and
- Large populations of pests and mosquitoes can result from the stockpiling of scrap tires which can act as "incubators".

To provide further detail on these types of benefits, a limited literature review was conducted using the journal libraries of the University of British Columbia and Simon Fraser University, along with on-line tire industry journals and government department web sites. Furthermore, the headquarters and Nanaimo regional offices of the Ministry were able to provide some supporting reports.

With respect to the environmental impacts associated with tire fires, one study found that air emissions from uncontrolled burning tend to be more toxic than that resulting from controlled combustion. Specifically, emissions from uncontrolled tire fires have been associated with acute and chronic health problems. Furthermore, these emissions have been estimated to be 16 times more mutagenic than those from wood burning, and 13,000 times more in comparison to emissions from coal burning utilities assuming that these facilities have efficient combustion technologies and add-on controls. In like fashion, bio-assay tests found that the mutagenic emission factor resulting from the open burning of tires is three to four times greater in magnitude than that resulting from the combustion of oil, coal or wood in utility boilers.[7] There are also

[7] *Refer to California Integrated Waste Management Board (1996).*

reported land degradation and water contamination issues associated with scrap tire stockpile fires, with one particular incident resulting in large quantities of pyrolitic char, oil and gas. More specifically, the site of this fire was deemed to be hazardous, samples of surface water had detectable concentrations of barium, chromium and zinc, and the presence of subsurface gravel indicated that oil might migrate and contaminate an adjacent stream. At the same time, tests of controlled combustion show that, with the exception of zinc emissions, "potential emissions from TDF are not expected to be very much different than from conventional fossil fuels, as long as combustion occurs in a well-designed, well-operated and well-maintained combustion device."[8] Another article determined that the combustion of TDF generally results in lower NO_x emissions and heavy metal content in ash residue as compared to coal, although zinc was present at higher values.[9]

In terms of their landfill characteristics, and as with rigid plastic containers, whole scrap tires are incompressible, non-biodegradable items that are generally comprised of 75% void space.[10] As a result, they are considered to be an undesirable constituent of landfills because they displace available capacity with void space.

Another issue is the potential for leachate from scrap tires and attendant environmental impacts. Most of the available reports tend to focus on the impacts from the use of scrap tires, either whole or in some shredded form, in various structural applications such as artificial reefs, light road fill, embankments and architectural projects. A number of these studies have found that shredded scrap tire material can be acutely toxic over the short-term, with one article reporting that the toxicity to aquatic organisms persists for "several weeks".[11] The authors of another study concluded that the probability of release of toxic chemicals will be higher when newly discarded tires are used, and that it may be preferable to use whole tires rather than chips given that the release of metals is "blocked" by the rubber cover.[12] However, a third article noted that based upon a review of 24 other studies, the use of scrap tires in civil engineering applications do not have significant impacts on the environment subject to local conditions.[13]

Lastly, the potential for stockpiled scrap tires to provide a breeding ground for mosquitoes, as well as rats and snakes, is frequently referred to in applied research literature, as well as in public education materials, as a significant hazard. With respect to mosquitoes, stockpiled tires provide a breeding ground due to the capability of tires to hold stagnant water for long periods. One paper,

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8 *Refer to Reisman, J. (1997).*

9 *Refer to Amari, T., Themelis, NJ, and Wernick, IK (1999).*

10 *Refer to California Integrated Waste Management Board (1996).*

11 *Refer to Hartwell SI, Jordahl DM, Dawson CEO, Ives AS (1998).*

12 *Refer to O'Shaughnessy V. and Garga VK (2000).*

13 *Refer to Aggelen van, GC (1992) and (1993); BAR Environmental Inc. (1992); California Integrated Waste Management Board (1996); and Liu, HS, JL Mead and Stacer, RG (1998) respectively.*

for example, reports that the import and transportation of scrap tires served as the means by which the tiger mosquito was brought into the United States as well as the mechanism through which it was spread across "much" of the Eastern US. In terms of public health, mosquitoes are known to be a carrier of a variety of viruses,[14] including the West Nile fever, which has emerged as a recent health concern.

B. Economic (Business)

As described earlier in this report, the tire recycling industry in British Columbia is comprised of a number of different operations, ranging from transporters to facilities that use scrap tires for fuel and manufacturers of intermediary products (e.g., rubber crumb) or final products (e.g., mats and shingles). Currently, the primary TDP is crumb rubber, which is sold as a material to be converted into other marketable goods.

It is within this context that the FIRST program contributes to provincial economic activity directly and through a series of secondary impacts. The public and private sector expenditures associated with the program represent the direct impacts. The ensuing ripple effects upon the provincial economy represent secondary economic impacts. With respect to the former, direct impacts are often described as the outcomes from the activities of public and private sector operations as well as investments in machinery, equipment and construction. The program also generates secondary expenditures throughout the economy. These can be described as indirect effects, which are associated with purchases of goods and services from suppliers within the province, and induced impacts that are generated through the spending of employee earnings.

To derive the estimates of direct, indirect and induced impacts, the 1996 British Columbia Input-Output ("IO") Model as administered by BC Stats was used. This model incorporates data from Statistics Canada along with additional data concerning employment and tax flows from other government sources. A further distinction is made in terms of Gross Domestic Product ("GDP"), employment and government revenue effects. The provincial GDP reflects the value added by BC businesses and workers. Employment impacts, in turn, recognize that as economic activity is generated through direct, indirect and induced expenditures, workers are required to produce the desired goods and services. Finally, tax revenues for governments were also derived. Using the major transaction types, the model that was used for this research applies tax rates to commodity (i.e., goods and services) and income streams. In this manner, it generates estimates of the revenue collected by both the BC provincial and the federal governments.

The estimates of direct, indirect and induced impacts in terms of employment, GDP, Provincial government revenues and federal revenues are summarized in Table II-1 on the following page. These impacts are reported on an annual basis, and were based on the survey and interview data for fiscal 2000/01.

14 *Refer to Moore CG and Mitchel CJ. (1997).*

Table II-1: Summary of economic (business) benefits

	Direct Impacts (rounded)	Indirect and Induced Impacts (rounded)	Total (rounded)
Transporters			
1. Employment	87 jobs	23 jobs	110 jobs
2. GDP	$2.57 million	$1.47 million	$4.04 million
3. Provincial Revenues	$0.20 million	$0.23 million	$0.43 million
4. Federal Revenues	$0.21 million	$0.13 million	$0.34 million
Processors – End Users			
1. Employment	50 jobs	35 jobs	85 jobs
2. GDP	$2.39 million	$2.55 million	$4.94 million
3. Provincial Revenues	$0.24 million	$0.33 million	$0.57 million
4. Federal Revenues	$0.28 million	$0.18 million	$0.46 million

Notes: 1 – Revenue estimates exclude corporate taxes.

Overall, it is estimated that a total of 195 jobs (i.e., direct, indirect and induced) has been created in the transportation, processing and end-use sub-sectors. In addition, almost $9 million in total industry GDP, and $1.8 million in total Provincial and Federal revenues (i.e., excluding corporate taxes), is generated on an annual basis.

As noted earlier, these figures were not adjusted to account for the economic impacts that might result in the absence of the FIRST program and, therefore, the tire levy. Essentially, in the absence of the program, there would be an additional $6.3 million circulating among the population in the province which could reasonably be expected to be spent in some fashion, thereby generating domestic economic impacts. Drawing upon the IO model though, the presence of the FIRST program has resulted in almost 195% more employment (i.e., direct, indirect and induced across all participant categories) and roughly 120% more in total GDP in comparison to the "no program" case.

Finally, to provide an indication of the trend in industry growth, respondents that were in operation over the life of the program were asked to report on the volumes of scrap tires that they handled. These select program participants noted increases in average volumes of scrap tires handled ranging from 85% to over 700% between 1992 and 2000. Furthermore, industry respondents indicated that market values for tire-derived products and fuel have improved since 1992. The representatives from Regional Districts that were interviewed reaffirmed these observations, noting that the scrap tire recycling industry has been "built up around" the FIRST program. These findings suggest that over the life of the FIRST program, there has been substantial growth in market demand and volumes of scrap tires transported and utilized by the tire recycling industry.

C. Program Administration

As described earlier, approximately $10 million is collected by retailers on an annual basis as a result of the tire levy and is remitted to the Provincial government. Annual expenditures, in turn, have historically ranged from a low of roughly $3 million (partial year) to over $6 million. For the purposes of the IO model, expenditures for program administration totaling an estimated $246,000 in fiscal 2000/01 were applied and treated as being equivalent to a "business services industry".[15] This allowed for the segregation of expenditures into wages and profit, overhead, rent, supplies and other cost categories. As a result, estimates of indirect employment, GDP and government revenues could be derived.

As evidenced by the following figures, the program is administered on an efficient basis, with only 2.25 full-time individuals being directly employed by both the Ministry and the contracted consulting firm. Indirect employment impacts are limited to one job, and total annual GDP (i.e., direct, indirect and induced) attributable to the administration of the program is $264,000. Finally, it estimated that an annual total of $19,000 in Provincial revenues and $16,500 in Federal revenues can be attributed to program administration.

15 Comprised of roughly $50,000 in costs for Ministry staff and $196,000 in fees and expenses for PricewaterhouseCoopers.

III. Conclusion

This study provides an assessment of the range of impacts (benefits) that can be associated with the advent and ongoing administration of the FIRST program. Drawing upon the BC IO model and available literature, these potential benefits have been summarized in Table III-1 below. It should be noted that with the exception of an extension in the operational lives and capacities of landfills and disposal facilities, which is reported as a cumulative benefit, those impacts that could be quantified are presented as annual values and draw upon fiscal 2000/01 figures.

Table III-1: Summary of estimated benefits and impacts

Environmental and Social	Economic (Business)
❑ Cumulative benefits over the life of the program associated with an expanded life and capacity of landfills and disposal facilities ranging from roughly $7.2 million to $14.4 million, with an average value of $10.8 million. ❑ A reduced likelihood of uncontrolled fires, and attendant pollution and health impacts, that can be associated with stockpiling. ❑ Removal of breeding habitat for mosquitoes and other pests such as rats. ❑ Avoidance of any potential leachate from scrap tires and associated environmental impacts under certain short-term conditions.	❑ Enhanced market values for tire derived products and fuel. ❑ Reported increases in the volumes of scrap tires handled and level of industrial activity. ❑ A total of 195 jobs (direct, indirect and induced) in the transportation, processing and end-use sub-sectors. ❑ Almost $9 million in annual industry GDP (direct, indirect and induced). ❑ Approximately $1.8 million in annual Provincial and Federal revenues, excluding corporate taxes.

There are also positive economic benefits generated through the ongoing administration of the FIRST program, which supports a total of 3.25 jobs (i.e., direct and indirect). Other attendant benefits include an estimated $264,000 in annual GDP (i.e., direct, indirect and induced) and approximately $35,500 in annual Provincial and Federal revenues (i.e., excluding corporate taxes).

Appendix A : References

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